

Historic, Archive Document

Do not assume content reflects current scientific knowledge, policies, or practices.

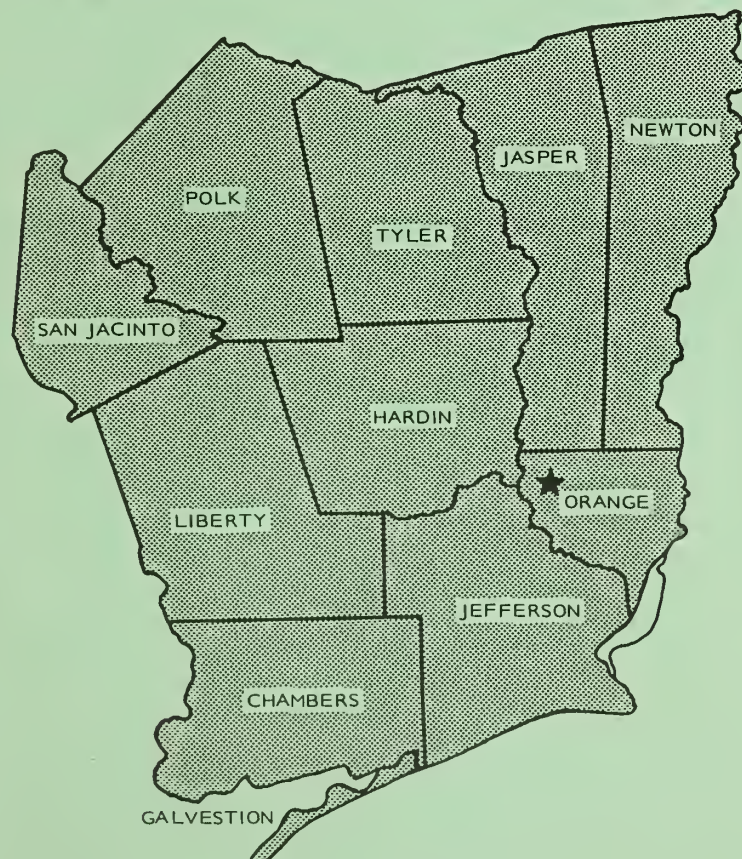
SOUTHEAST TEXAS RESOURCE CONSERVATION & DEVELOPMENT PROJECT

U.S. DEPT. OF AGRICULTURAL
NATIONAL AGRICULTURAL LIBRARY

MAY 20 1980

CATALOGING = PREP,

YEAGER DITCH PROJECT MEASURE WORK PLAN ORANGE COUNTY, TEXAS



AD-88 Bookplate
(1-48)

NATIONAL

A
G
R
I
C
U
L
T
U
R
A
L



LIBRARY

PROJECT MEASURE WORK PLAN AGREEMENT

between the

Lower Sabine-Neches Soil and Water Conservation District
Local Organization

Orange County Drainage District
Local Organization

Southeast Texas Resource Conservation and Development Project Board of Directors
Local Organization

State of Texas
(hereinafter referred to as the Sponsoring Local Organization)

and the

Soil Conservation Service
United States Department of Agriculture
(hereinafter referred to as the Service)

Whereas, application has heretofore been made to the Secretary of Agriculture by the Sponsoring Local Organization for assistance in preparing a plan for works of improvement for the Yeager Ditch Project Measure Area in the approved Southeast Texas Resource Conservation and Development Project, State of Texas, under the authority of the Food and Agricultural Act of 1962 (Public Law 87-703) as amended; and the Soil Conservation Act of 1935 (16 U.S.C.-590a-f); and

Whereas, the responsibility for administration of the Resource Conservation and Development Program, as authorized by Section 102 of the Food and Agriculture Act of 1962, has been assigned by the Secretary of Agriculture to the Service; and

Whereas, there has been developed through the cooperative efforts of the Sponsoring Local Organization and the Service a mutually satisfactory plan for works of improvement for the Yeager Ditch Project Measure Area, State of Texas, hereinafter referred to as the Project Measure Work Plan, which plan is annexed to and made a part of this agreement;

Now therefore, in view of the foregoing consideration, the Sponsoring Local Organization and the Secretary of Agriculture, through the Service, hereby agree on the Project Measure Work Plan, and further agree that the works of improvement as set forth in said plan can be installed in about 2 years.

It is mutually agreed that in installing and operating and maintaining the works of improvement substantially in accordance with the terms, conditions, and stipulations provided for in the Project Measure Work Plan:

1. The Sponsoring Local Organization will acquire without cost to the Federal Government such land rights as will be needed in connection with the works of improvement. (Estimated cost \$48,500.)

2. The Sponsoring Local Organization will provide relocation advisory assistance services and make the relocation payments to displaced persons as required by the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970 (Public Law 91-646, 84th Stat. 1894) effective as of January 2, 1971, and the Regulations issued by the Secretary of Agriculture pursuant thereto. Prior to July 1, 1972, the Sponsoring Local Organization will comply with the real property acquisition policies contained in said Act and Regulations to the extent that they are legally able to do so in accordance with their State law. After July 1, 1972, the real property acquisition policies contained in said Act shall be followed in all cases.

The Service will bear 100 percent of the first \$25,000 of relocation payment costs for any person, business, or farm operation displaced prior to July 1, 1972. Any such costs for a single dislocation in excess of \$25,000 and all costs for relocation payments for persons displaced after July 1, 1972, will be shared by the Sponsoring Local Organization and the Service as follows:

	<u>Sponsoring Local Organization</u> (percent)	<u>Service</u> (percent)	<u>Estimated Relocation Payment Costs</u> (dollars)
Relocation Payments	45.86	54.14	0 <u>1</u> /

1/ Investigations have disclosed that under current conditions the project measure will not result in the displacement of any person, business, or farm operation. However, if relocations become necessary, relocation payments will be cost-shared in accordance with the percentages shown above.

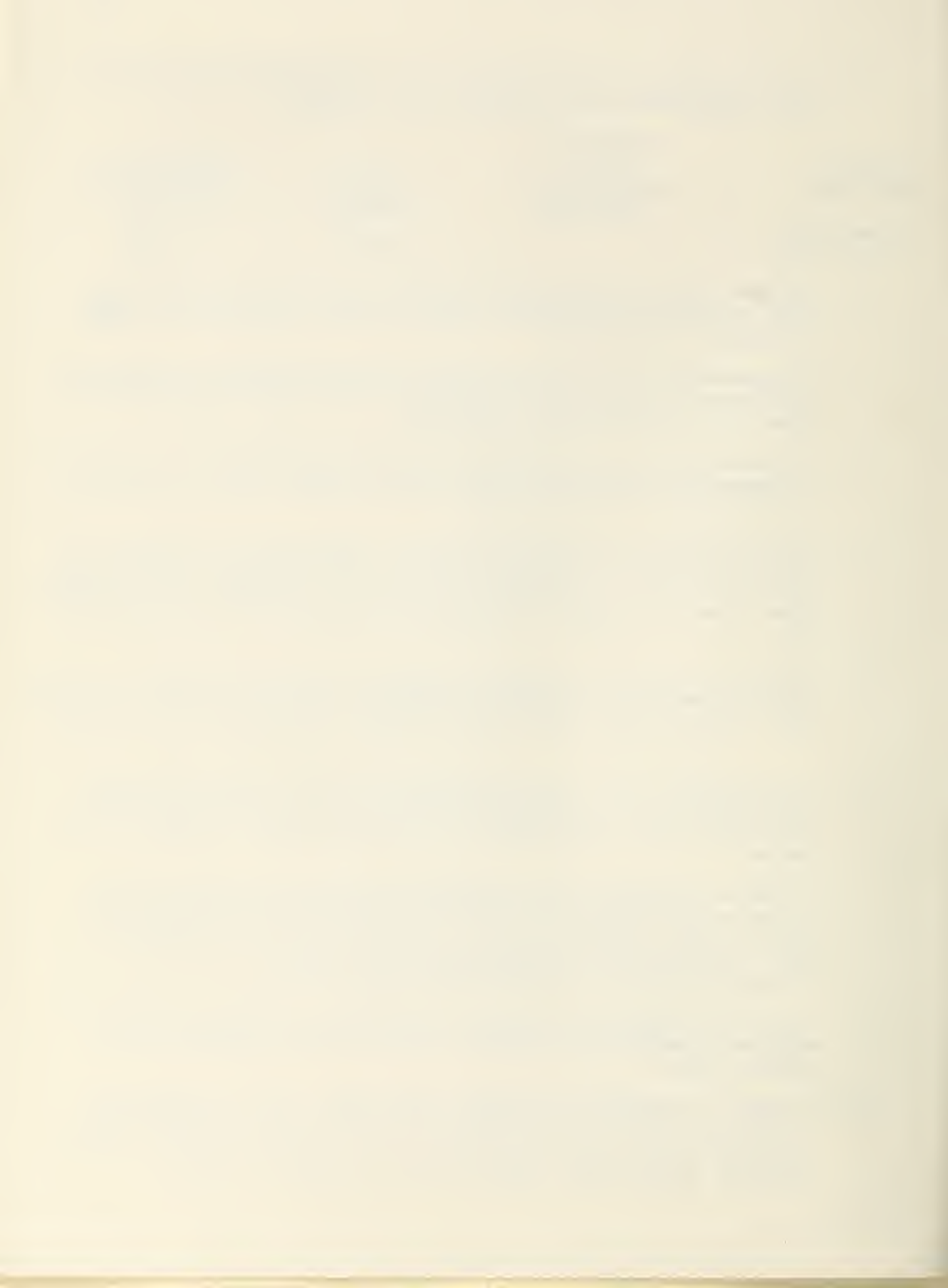
3. The Sponsoring Local Organization will acquire or provide assurance that landowners or water users have acquired such water rights pursuant to State law as may be needed in the installation and operation of the works of improvement.
4. The percentages of construction costs of structural measures to be paid by the Sponsoring Local Organization and by the Service are as follows:

<u>Works of Improvement</u>	<u>Sponsoring Local Organization</u> (percent)	<u>Service</u> (percent)	<u>Estimated Construction Cost</u> (dollars)
Stream Channel Improvement	-	100.00	\$47,350

5. The percentages of the engineering costs to be borne by the Sponsoring Local Organization and the Service are as follows:

<u>Works of Improvement</u>	<u>Sponsoring Local Organization (percent)</u>	<u>Service (percent)</u>	<u>Estimated Engineering Cost (dollars)</u>
Stream Channel Improvement	-	100.00	\$ 7,100

6. The Sponsoring Local Organization and the Service each will bear the costs of Project Administration which it incurs, estimated to be \$500 and \$11,790, respectively.
7. The Sponsoring Local Organization will provide assistance to landowners and operators to assure the installation of the land treatment measures shown in the Project Measure Work Plan.
8. The Sponsoring Local Organization will encourage landowners and operators to operate and maintain the land treatment measures for the protection and improvement of the watershed.
9. The Sponsoring Local Organization will be responsible for the operation and maintenance of the structural works of improvement by actually performing the work or arranging for such work in accordance with agreements to be entered into prior to issuing invitations to bid for construction work.
10. The costs shown in this agreement represent preliminary estimates. In finally determining the costs to be borne by the parties hereto, the actual costs incurred in the installation of works of improvement will be used.
11. This agreement is not a fund-obligating document. Financial and other assistance to be furnished by the Service in carrying out the Project Measure Work Plan is contingent on the appropriations of funds for this purpose.
- A separate agreement will be entered into between the Service and the Sponsoring Local Organization before either party initiates work involving funds of the other party. Such agreement will set forth in detail the financial and working arrangements and other conditions that are applicable to the specific works of improvement.
12. The Project Measure Work Plan may be amended or revised, and this agreement may be modified or terminated, only by mutual agreement of the parties hereto.
13. No member of Congress, or resident commissioner, shall be admitted to any share or part of this agreement, or to any benefit that may arise therefrom; but this provision shall not be construed to extend to this agreement if made with a corporation for its general benefit.



14. The program conducted will be in compliance with all requirements respecting nondiscrimination as contained in the Civil Rights Act of 1964 and the regulations of the Secretary of Agriculture (7 C.F.R. 15.1-15.12), which provide that no person in the United States shall, on the ground of race, color, or national origin, be excluded from participation in, be denied the benefits of, or be subjected to discrimination under any activity receiving Federal financial assistance.

Lower Sabine-Neches Soil and Water Conservation District

Local Organization

By E. M. Brewer
 E. M. Brewer
 Title Chairman
 Address Route 3, Box 528
Orange, Texas 77630
 Date December 13, 1971 Zip code

The signing of this agreement was authorized by a resolution of the governing body of the Lower Sabine-Neches Soil and Water Conservation District adopted at a meeting held on December 13, 1971 Local Organization

George Gail
 (Secretary, Local Organization)
 George Gail
 Address 350 Pineburr Street
Vidor, Texas 77662
 Date December 13, 1971 Zip Code



Orange County Drainage District

Local Organization

By

George Gall
George Gall

Title

Vice-Chairman

Address

350 Pineburr Street
Vidor, Texas 77662

Zip Code

Date December 13, 1971

The signing of this agreement was authorized by a resolution of the governing body of the Orange County Drainage District

Local Organization

adopted at a meeting held on December 13, 1971

By

George O. Hilliard
(Secretary, Local Organization)
George O. Hilliard

Address

Route 6, Box 99
Orange, Texas 77630

Zip Code

Date December 13, 1971

Southeast Texas Resource Conservation and
Development Project Board of Directors

Local Organization

By

W.S. Edwards
W.S. Edwards

Title

Chairman

Address

Box 86
Stowell, Texas 77661

Zip Code

Date December 13, 1971

The signing of this agreement was authorized by a resolution of the governing body of the Southeast Texas RC&D Project Board of Directors

Local Organization

adopted at a meeting held on December 13, 1971

Acting

(Secretary, Local Organization)

G. R. Bauer
G. R. Bauer

Address

1095 22nd Street
Beaumont, Texas 77706

Zip Code

Date December 13, 1971

Soil Conservation Service
United States Department of Agriculture

By

W. R. W. Graham
State Conservationist

Date

12/20/71



YEAGER DITCH
PROJECT MEASURE WORK PLAN

Orange County, Texas

A Watershed Protection and Flood Prevention Project Measure of the
Southeast Texas Resource Conservation and Development Project

Prepared Under the Authority of Food and
Agriculture Act of 1962 (Public Law 87-703)
as amended and the Soil Conservation Act
of 1935 (16.U.S.C.-590 a-f).

Prepared By:

Lower Sabine-Neches Soil and Water Conservation District
(Sponsor)

Orange County Drainage District
(Sponsor)

Southeast Texas Resource Conservation
and Development Project Board of Directors
(Sponsor)

With Assistance By:

U.S. Department of Agriculture
Soil Conservation Service
December 1970



YEAGER DITCH

PROJECT MEASURE WORK PLAN

Orange County, Texas
December 1970

SUMMARY OF PLAN

The project measure work plan for watershed protection and flood prevention for the Yeager Ditch Project Measure Area was prepared by the Lower Sabine-Neches Soil and Water Conservation District, the Orange County Drainage District, and the Southeast Texas Resource Conservation and Development Project Board of Directors, as sponsoring local organizations. Technical assistance was provided by the Soil Conservation Service, United States Department of Agriculture.

The project measure area covers 1.21 square miles, or 775 acres, in Orange County, Texas. Land use is about 48 percent pasture and woody pasture and 52 percent miscellaneous uses such as residential areas, roads, railroads, farmsteads, stream channel, etc.

The principal problem is one of frequent flooding on portions of the 325 acres of flood plain along Yeager Ditch. This flooding results in damage to residential and business property, pasture land, roads, and railroads. In addition, flooding is a deterrent to development and economic growth within the area.

The objectives of the project measure are to provide proper land use and treatment on agricultural lands and flood prevention for the flood plain lands along Yeager Ditch.

The project measure work plan proposes installing in a two-year period needed land treatment measures and 10,735 feet of main stem channel improvement and 1,400 feet of side lateral improvement at a total estimated installation cost of \$122,340. The share of total project measure installation cost from sources other than Resource Conservation and Development funds is estimated to be \$56,100 and the share from Resource Conservation and Development funds is estimated to be \$66,240.

The project measure will benefit directly the owners and occupants of an estimated 65 residential, business, and agricultural units through a reduction of floodwater and associated damages. Average annual benefits accruing to structural measures included in the plan are estimated to be \$21,270 which includes \$4,660 damage reduction benefits, \$14,750 enhancement benefits, and \$1,860 secondary benefits. The ratio of total average annual benefits accruing to structural measures (\$21,270) to the average annual cost (\$6,700) is 3.2:1.0.



DESCRIPTION OF PROJECT MEASURE AREA

Physical Data

The Yeager Ditch project measure area is located entirely within Orange County, Texas just south of the City of Vidor and about eight miles east of Beaumont.

Yeager Ditch heads at the southeast edge of Vidor, flows generally southward for a distance of about two miles and enters a marsh which borders the Neches River. About 10 miles directly southeast, the Neches River flows into Sabine Lake, a closed estuary. The drainage area, comprising 775 acres or 1.21 square miles, is about 2.4 miles long and ranges from 0.30 to 0.85 mile wide.

The project measure area lies within the Southern Coastal Plain Land Resource Area and is entirely within the outcrop of Pleistocene stream channel, point bar, natural levee, and backswamp, coastal marsh, and mud flat deposits belonging to the Beaumont Formation. It consists mainly of clay and silt, but sand is abundant locally. The project measure area occurs on a flat, featureless plain which is dissected very little by streams. Elevations range from about 2 to 20 feet above sea level.

The predominant soil series are Wrightsville, Acadia, and Waller, which are deep, poorly drained, and acid. The surface texture is primarily silt loam, but fine sandy loam and clay loam occur also. Subsoils are primarily clay and clay loam. Internal drainage is very slow and runoff is slow.

Studies indicate that moderately to high plastic clay soils with occasional inclusions of very thin sand lenses, blanket the surface and extend to at least six feet beneath the present channel bottom. The Beaumont Formation underlies Yeager Ditch.

The land use of the project measure area is about 48 percent pasture and woody pasture and 52 percent miscellaneous uses including residential areas, roads, railroads, farmsteads, and stream channel.

The climate is warm and humid. The mean annual precipitation is about 53 inches. Rainfall is fairly well distributed throughout the year. Temperatures range from a mean maximum of 82 degrees Fahrenheit in July to a mean minimum of 54 degrees in January.

There is no significant fish and wildlife habitat in the watershed.

Economic Data

The economy of the project measure area is dependent upon employment of the residents in the Beaumont, Orange, and Port Arthur industrial complex. Major industries include petrochemical plants, oil and gas refineries, ship building, and shipping.

Vidor, population 9,670, is the nearest town to the project measure area and is the center of economic activity for residents of the area.

Major cities nearby include Beaumont, Orange, and Port Arthur.

Land Treatment Data

There are 9 operating units wholly or partially within the project measure area, of which 5 (71 percent of the agricultural land) are under agreement with the Lower Sabine-Neches Soil and Water Conservation District.

Approximately 30 percent of needed land treatment practices on pastureland have been applied. An estimated 95 percent of the land is adequately protected from erosion. No serious erosion problems resulting from improper land use exist within the watershed.

PROBLEMS OF PROJECT MEASURE AREA

Flooding occurs frequently in the project measure area causing damages to agricultural and nonagricultural properties. Minor floods inundating less than half the flood plain, occur on the average of twice a year and cause damages to road crossings, yards, and pastureland. Large floods which inundate residential units to above the flood level occur on the average of about every five years. Floods of this magnitude result in about \$4,300 direct floodwater damages to residential, business, and miscellaneous properties and about \$70 to pastureland.

The most damaging flood in recent years occurred October 11, 1970, and inundated about 210 acres of residential, pasture, and miscellaneous lands. It is estimated that direct floodwater damage from this flood, which had a recurrence interval of about 10 years, would be about \$9,100 at the present level of development. Other recent major floods occurred in 1968 and 1963.

A flood having a recurrence interval of 100-years would inundate about 325 acres of flood plain, of which 150 acres is in pasture and 175 acres is in residential and miscellaneous uses, and result in floodwater damages to 65 residential, business, and agricultural units. Direct damages from such a flood are estimated at \$32,400 to existing developments.

For the floods expected to occur during the evaluation period, which includes floods up to and including the 100-year frequency event, the total direct floodwater damage is estimated to average \$3,970 annually at adjusted normalized prices (table 5).

Indirect damages such as interruption of travel, evacuation of premises when floods threaten, and similar losses are estimated to average \$790 annually.

In addition to the direct floodwater damages suffered by residents of the project measure area, other significant associated problems exist. Flood damages and the ever present threat of greater loss of properties from a flood of a magnitude not yet experienced have a depressing effect on the economy of the project measure area. Flooding is a deterrent to development and economic growth. Portions of the flood plain are unsuitable for residential development because of frequent flooding. Property values are depressed as a result of the ever present flood hazard. As a result, the environmental quality of the area has deteriorated.

WORKS OF IMPROVEMENT TO BE INSTALLED

Land Treatment Measures

An estimated 150 acres of pastureland will receive land treatment during the two-year project measure installation period (table 1). The practices to be applied are in addition to treatment presently being applied and include brush control, pasture planting, and pasture management. These measures will be established and maintained by landowners and operators in cooperation with the Lower Sabine-Neches Soil and Water Conservation District.

Increased application and maintenance of land treatment measures is particularly important for protection of the 1.21 square mile drainage area of the planned stream channel improvement. This treatment will reduce sediment accumulation in the channel and will afford a greater protection to preventing erosion of side inlets and the spoil area.

Structural Measures

There will be 10,735 feet of main stream channel improvement to Yeager Ditch and 1,400 feet of side lateral improvement to be installed to afford the needed protection to agricultural, residential, and miscellaneous properties which cannot be provided by land treatment measures alone.

The location of the stream channel improvement is shown on the Project Measure Map (figure 1).

The capacity of the improved channel will convey safely the expected peak discharge from a 100-year 24 hour rainfall event at or below bankful elevation. The instantaneous design peak discharge was determined by application of the appropriate factor from Stephens-Mills to the removal rate discharge calculated by the Cypress Creek Formula, $Q = CM^{5/6}$. Rainfall and runoff amounts used to calculate the removal discharge was 13.0 inches and 10.5 inches respectively.

For protection of the channel from erosion and sediment, pipe drops and sod ramp side inlets are planned. After the stream channel improvement has been constructed, a suitable type of grass will be planted for quick cover as a control practice to prevent erosion in the channel and spoil area.

The design velocities are within the allowable as set forth in Technical Release No. 25. Tables 1, 2, and 3 show details on cost, quantities, and design of the structural works of improvement.

Installation of the structural works of improvement will require relocation or modification of known existing improvements including Gulf States Utility Company lines, Terry Road crossing, Cherokee Road crossing, Housemann Drive crossing, Southern Pacific Transportation Co. railroad bridge and communication lines, F.M. 105 crossing, two private low water crossings, several privately owned improvements, and Southwestern Bell Telephone Company buried cable. Cost of these items will be borne by the sponsoring local organizations.

EXPLANATION OF INSTALLATION COSTS

Land treatment measures will be applied by local interests at an estimated cost of \$7,100. This includes \$1,100 of Public Law 46 funds to be provided by the Soil conservation Service under its going program for technical assistance during the two-year installation period.

The total cost for installation of the flood prevention main and lateral channel is estimated to be \$115,240 of which \$66,240 will be borne by Resource Conservation and Development funds and \$49,000 by local interests.

The Resource Conservation and Development costs for installation of the flood prevention main and lateral channel are \$47,350 for construction, \$7,100 for engineering services, and \$11,790 for project administration.

The local costs for installation of the flood prevention main and lateral channel includes \$10,000 for the value of land easements, \$1,200 for modification of two low water crossings, \$1,300 for fence relocation, \$33,000 for modification of public bridges, \$2,000 for modification of a buried telephone cable, \$500 for relocation of light and power poles, \$500 for legal fees, and \$500 for project administration.

Construction costs include the engineer's estimate and contingencies. Ten percent of the engineer's estimate was added as a contingency to provide for unpredictable construction costs.

Engineering services and project administration costs were based on an analysis of previous work in similar areas. Engineering services costs consist of, but are not limited to detailed surveys, geologic investigations, laboratory analysis, reports, designs, and cartographic services.

Resource Conservation and Development project administration costs consist of construction inspection, contract administration, maintenance of Soil Conservation Service State Office records and accounts, and Washington Office and E&WP Unit costs.

The local costs for project administration include sponsors costs related to contract administration, overhead and administrative costs, and whatever construction inspection they desire to make at their own expense.



PROJECT MEASURE BENEFITS

The project measure will benefit directly the owners and occupants of an estimated 65 residential, business, and agricultural units in the project area through a reduction of floodwater damages and enhancement of the value of existing properties.

The proposed project measure will eliminate damaging flooding resulting from overflow of Yeager Ditch, from all residential, pasture, and miscellaneous lands, resulting from floods up to and including a 100-year frequency event. Floods larger than the 100-year frequency event still will cause some damage after project installation. Flooding from a 100-year frequency flood event will be eliminated from 325 acres and monetary floodwater damages of \$32,400 will be eliminated.

The estimated average annual monetary floodwater and indirect damages (table 5) of \$4,760 will be eliminated. Of the \$4,760 damage reduction benefits, \$4,660 will accrue to stream channel improvement and \$100 to land treatment measures.

The reduction in flooding afforded by the project measure will allow urban development on flood plain areas not now suitable because of the flood hazard. Enhancement benefits from increased development are estimated to be \$7,830 annually. Property values in the project area are also expected to increase as a result of the installation of the project measure. These benefits are estimated to average \$6,920 annually.

Secondary benefits stemming from the project measure will accrue in the project area. The value of these local benefits are estimated to be \$1,860 annually. Secondary benefits from a national viewpoint were not considered pertinent to the economic evaluation.

A joint study by biologists of the Bureau of Sport Fisheries and Wildlife, the Texas Parks and Wildlife Department, and the Soil Conservation Service indicate that the project measure will compliment the wildlife habitat without any adverse effects. The project measure will benefit the areas fauna in many respects. Furbearers and all ground nesting animals will be helped by the elimination of floodwaters. Song bird and bobwhite quail reproduction will be benefited by a reduction in the number of nests that would be flooded. Most of the area is poor to fair squirrel habitat; however, the few squirrels that make use of the area will be able to do more ground feeding and make use of available food with the reduction in flooding.

Significant intangible public health benefits will accrue in the project area including increased sense of security, elimination of health hazards associated with damage to water supply and waste disposal systems, improved vector control, and the prevention of other factors accompanying floods which tend to disrupt the maintenance of public health. Additional intangible benefits will accrue to the project allowing an opportunity for the shifting of public funds from the repair of damage to water lines and streets to investment in schools, libraries, and other public facilities that improve the quality of living. Likewise, private funds now going to

repair of flood damage could be shifted to raising the standard of living of the residents in the affected area.

COMPARISON OF BENEFITS AND COSTS

The total average annual costs of the project structural measure (amortized total installation and project administration cost, plus operation and maintenance) is \$6,700. The project structural measure is expected to produce average annual benefits, excluding secondary benefits, of \$19,410 resulting in a benefit-cost ratio of 2.9:1.0.

The ratio of total average annual benefits accruing to the project structural measure (\$21,270) to the average annual cost (\$6,700) is 3.2:1.0.

PROJECT INSTALLATION

Landowners and operators will establish planned land treatment (table 1) in cooperation with the Lower Sabine-Neches Soil and Water Conservation District during the two-year installation period. Technical assistance in planning and application of land treatment is provided under the going program of the District. Landowners and operators of land where the stream channel improvement will be located will be encouraged to apply and maintain land treatment measures for the enhancement of wildlife habitat.

The Soil Conservation Service will provide technical assistance in the planning and application of soil, plant, wildlife, and water conservation measures.

The Orange County Drainage District has the right of eminent domain under applicable State law and has financial resources necessary to fulfill their responsibilities.

The Soil Conservation Service will provide the necessary administrative and clerical personnel; facilities, supplies, and equipment to advertise, award, and administer contracts; and will be the contracting agency to let and service contracts. The Orange County Drainage District will represent the sponsoring local organizations in coordination with the Soil Conservation Service on matters concerning construction.

The Orange County Drainage District will have the following responsibilities pertaining to the installation of the planned stream channel improvement.

1. Obtain the necessary land rights for all works of improvement.
2. Provide for the necessary relocation or modification of the following known existing improvements.

- a. Gulf States Utility Company lines
 - b. Terry Road crossing
 - c. Cherokee Road crossing
 - d. Housemann Drive crossing
 - e. Southern Pacific Transportation Company railroad bridge and communication lines
 - f. F.M. 105 crossing
 - g. Two private low water crossings
 - h. Privately owned improvements
 - i. Southwestern Bell Telephone Company buried cable
3. Determine and certify legal adequacy of easements and permits for construction of the stream channel improvement.

Technical assistance will be provided by the Soil Conservation Service in preparation of plans and specifications, construction inspection, preparation of contract payment estimates, final inspection, execution of certification of completion, and related tasks necessary to install the stream channel improvement.

FINANCING PROJECT INSTALLATION

Federal assistance for carrying out works of improvement described in this work plan will be provided under authority of the Food and Agriculture Act of 1962 (Public Law 87-703), as amended and the Soil Conservation Act of 1935 (16.U.S.C.-590 a-f).

The cost of applying land treatment measures will be borne by landowners and operators.

Funds for the local share of this project measure relative to structural measures will be provided by the Orange County Drainage District which has the financial ability to make adequate arrangements for carrying out its responsibilities.

The stream channel improvement will be constructed during the two-year project installation period pursuant to the following conditions:

1. Requirements for land treatment in the drainage area of the stream channel improvement have been satisfied.
2. All land rights relative to the stream channel improvement have been obtained.
3. Provisions have been made, at no cost to the Federal Government, for the necessary relocation or modification of improvements, including utility lines and systems, bridges, low water crossings, and privately owned improvements.
4. Project measure agreement has been executed.
5. Operation and maintenance agreements have been executed.

6. Resource Conservation and Development funds are available.

PROVISIONS FOR OPERATION AND MAINTENANCE

Land Treatment Measures

Land treatment measures will be maintained by landowners and operators of farms and ranches on which the measures are applied under agreement with the Lower Sabine-Neches Soil and Water Conservation District. Representatives of the district will make periodic inspections of land treatment measures to determine maintenance needs and encourage landowners and operators to perform maintenance.

Structural Measures

The Orange County Drainage District will be responsible for operation and maintenance of the stream channel improvement. The estimated average annual operation and maintenance cost is \$760. Monies for this purpose will be supplied from the General Fund of the Orange County Drainage District.

A specific operation and maintenance agreement will be executed prior to the issuance of invitation to bid on construction of the stream channel improvement.

The stream channel improvement will be inspected at least annually and after each heavy rain by representatives of the Orange County Drainage District and the Lower Sabine-Neches Soil and Water Conservation District. The Soil Conservation Service will participate in these inspections for a period of at least three years following construction and as often as it elects to do so after the third year. Items of inspection will include, but will not be limited to, conditions of the channel, spoil area, and the associated vegetation, the need for removal or control of woody vegetation, removal of sediment, corrective measures for sediment sources from side drains or spoil banks, and for prevention of gully erosion and head cutting. Water flow control structures will be checked for condition of structural materials and for proper functioning.

Upon acceptance of the completed works of improvement from the contractor, the Orange County Drainage District will be totally responsible for operation and maintenance of the stream channel improvement. Maintenance will be performed promptly as the need arises.

The Soil Conservation Service will assist in operation and maintenance only to the extent of furnishing technical guidance.

Provisions will be made for unrestricted access by representatives of sponsoring local organizations and the Federal Government to inspect the stream channel improvement and its appurtenances at any time for the sponsoring local organizations to operate and maintain them.

The Orange County Drainage District will maintain a record of all maintenance inspections made, maintenance performed, and costs of such maintenance, and have it available for inspection by Soil Conservation Service personnel.

The necessary maintenance work will be accomplished either by contract, force account, or equipment owned by the sponsoring local organizations.

TABLE 1 - ESTIMATED PROJECT INSTALLATION COST

Yeager Ditch Project Measure						
Southeast Texas Resource Conservation and Development Project, Texas						
			Estimated Cost (Dollars) ^{1/}			
			RC&D			
			Number	Funds	Other	
			Non-	Non-	Non-	
			Federal	Federal	Federal	
Installation Cost Item	Unit	Land	Land	Land	Land	Total
<u>LAND TREATMENT</u>						
Soil Conservation Service						
Grassland	Acre	150	-	6,000		6,000
Technical Assistance			-	1,100		1,100
TOTAL LAND TREATMENT				7,100		7,100
<u>STRUCTURAL MEASURES</u>						
<u>Construction</u>						
Soil Conservation Service						
Stream Channel						
Improvement	Feet	12,135	47,350	-		47,350
Subtotal - Construction			47,350	-		47,350
<u>Engineering Services</u>						
Soil Conservation Service						
Stream Channel						
Improvement	Feet	12,135	7,100	-		7,100
Subtotal - Engineering Services			7,100	-		7,100
<u>Project Administration</u>						
Soil Conservation Service						
Construction Inspection			7,100	-		7,100
Other			4,690	500		5,190
Subtotal - Administration			11,790	500		12,290
<u>Other Costs</u>						
Land Rights			-	48,500		48,500
Subtotal - Other			-	48,500		48,500
TOTAL STRUCTURAL MEASURES			66,240	49,000		115,240
TOTAL PROJECT			66,240	56,100		122,340

^{1/} Price Base: 1970

December 1970

TABLE 2 - ESTIMATED STRUCTURAL COST DISTRIBUTION

Yeager Ditch Project Measure
Southeast Texas Resource Conservation and Development Project, Texas
(Dollars) 1/

Item	Construction	Installation Cost		Installation Cost ;				Total
		Engineering	RC&D	Total	Land	Other	Funds	
				RC&D	Rights	Other		Installation Cost
Stream Channel Improvement	47,350	7,100	54,450	48,500	48,500			102,950
Subtotal	47,350	7,100	54,450	48,500	48,500			102,950
Project Administration			11,790	500				12,290
GRAND TOTAL	47,350	7,100	66,240	48,500 <u>2/</u>	49,000			115,240

1/ Price Base: 1970

2/ Includes \$500 for legal fees, \$1,300 for fence relocation, \$1,200 for modification of low water crossings, \$500 for modification or relocation of utility lines and systems, \$33,000 for modification of existing bridges, and \$2,000 for modification of a buried telephone cable.

December 1970

TABLE 3 - STRUCTURE DATA

CHANNELS

Yeager Ditch Project Measure
Southeast Texas Resource Conservation and Development Project

Channel : (Number or : Name)	Station :Sq. Mi. :	Drainage : Area :	Capacity : cfs	Water : Surface : Elev.M.S.L.:	Hydraulic : Gradient : (ft/ft) :	Channel Dimensions : Bottom : Depth : (ft.) :	Slopes :	"n" Value : Aged :	As : Built :	Velocities : As : Aged :	Excava- : tion : Cu.Yds. :	Type of Improve- ment 2/	
Yeager Ditch	107+35	0.17	90	16.1	.0004	4	4:1	.030	.020	1.6	1.8	110	CE
	92+20	0.32	145	15.5	.0004	4	4:1	.030	.020	1.7	2.0	2,460	CE
	79+90	0.42	175	15.0	.0004	4	4:1	.030	.020	1.8	2.1	2,270	CE
	74+10	0.56	220	14.8	.0004	5	4:1	.030	.020	1.9	2.2	1,480	CE
	60+00	0.90	310	14.2	.0004	10	4:1	.030	.020	2.0	2.4	3,950	CE
	37+60	1.05	350	13.3	.0004	10	4:1	.030	.020	2.1	2.5	18,540	CE
	26+50	1.07	358	12.9	.0004	10	4:1	.030	.020	2.1	2.5	12,790	CE
	18+30	1.10	365	11.6	.0007	10	4:1	.030	.020	2.6	3.0	4,090	CE
	0+00	1.21	392	11/	.0020	-	-	.045	.030	3.7	3.6	-	C&S
Lateral 1A	0+00	0.09	49	14.9	.00015	10	4:1	.030	.020	0.7	1.0	3,780	CE

1/ Cross sectional area 106 square-feet and wetted perimeter 33 feet measured below hydraulic grade line.

2/ CE - Channel Enlargement
C&S - Clearing and Snagging

3/ Velocities resulting from 10-year frequency discharge.

December 1970

TABLE 4 - ANNUAL COST

Yeager Ditch Project Measure
Southeast Texas Resource Conservation and Development Project, Texas

(Dollars) 1/

Evaluation Unit	: Amortization : : of : : Installation : : Cost <u>2/</u> :	Operation : and : Maintenance : Cost :	Total
Stream Channel Improvement	5,310	760	6,070
Project Administration	630		630
GRAND TOTAL	5,940	760	6,700

1/ Price Base: Installation - 1970, O&M - Adjusted normalized prices.

2/ 100-years at 5-1/8 percent interest.

December 1970

TABLE 5 - ESTIMATED AVERAGE ANNUAL FLOOD DAMAGE REDUCTION BENEFITS

Yeager Ditch Project Measure
Southeast Texas Resource Conservation and Development Project, Texas

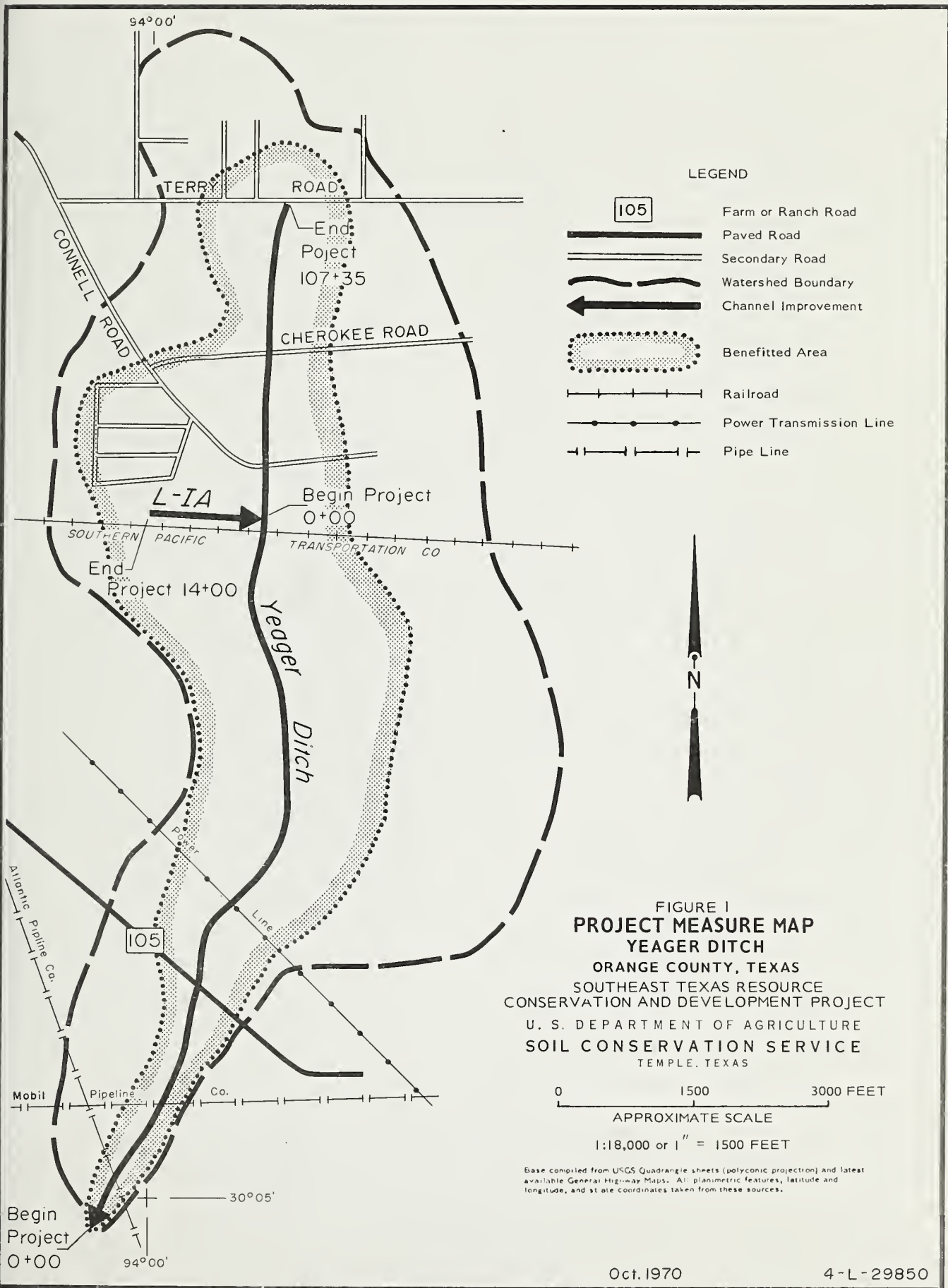
(Dollars) 1/

	: Estimated Average Annual Damage :		Damage
	: Without	: With	: Reduction
Item	: Project	: Project	: Benefits
Floodwater			
Crop and Pasture	60	0	60
Nonagricultural <u>2/</u>			
Residential and Business	3,750	0	3,750
Roads, Streets, and			
Railroad	160	0	160
Subtotal	3,970	0	3,970
Indirect	790	0	790
TOTAL	4,760	0	4,760

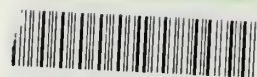
1/ Price Base: Adjusted normalized prices, April 1966.

2/ Evaluation of damages resulting from floods up to and including a 100-year frequency event. Floods larger than the 100-year frequency event still will cause some damage after project installation.

December 1970







R0000 259617



R0000 259617